IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Customer Number:	000201
Attorney Docket No.:	**C4007(C)**
Appellant:	Hage et al.
Serial No.:	09/650,134
Filed:	August 29, 2000
FOR:	COMPOSITION AND METHOD FOR BLEACHING A SUBSTRATE
UNUS No.:	Y2-0181-UNI

Group: 1751
Examiner: Gregory R. Delcotto
Edgewater, New Jersey 07020
January 22, 2003

BRIEF FOR APPELLANT

Commissioner For Patents
Washington, D.C. 20231

Sir:

This is a Brief on appellant's Appeal from the Examiner's Final Rejection concerning the above-identified application.

PATENT

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TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

Unilever Home & Personal Care USA, Division of Conopco, Inc. is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

III. STATUS OF CLAIMS

Claims 1-16 and 18-24 are on Appeal.

IV. STATUS OF AMENDMENTS

No claims have been amended in this continued Examination application. However, in the parent application, claims 1, 13 and 18 were amended, claims 22-24 were added and claim 17 was canceled.

V. SUMMARY OF THE INVENTION

Claim 1 relates to a liquid bleaching composition which includes an organic substance that forms a complex with a transition metal, the complex catalyzing bleaching of substrate by atmospheric oxygen without use of aldehydes, and a liquid carrier or solvent. The composition

allows at least 50% of any bleaching of the substrate to be effected by oxygen sourced from the air and is substantially devoid of peroxygen bleach or a peroxy-based or -generating bleach system.

Claim 2 further identifies the organic substance as a pentadentate ligand of a general formula (B).

Claim 3 identifies a specific ligand.

Claims 4 and 5 identify pH ranges.

Claim 6 further indicates that the composition is substantially devoid of a transition metal sequestrant.

Claim 7 adds the presence of a surfactant.

Claim 8 introduces to the composition a builder.

Claim 9 specifies that the organic substance comprises a preformed complex of a ligand and a transition metal.

Claim 10 identifies the organic substance as comprising a free ligand that complexes with a transition metal present in the water.

Claim 11 identifies the organic substance as comprising a free ligand that complexes with a transition metal present in the substrate.

Claim 12 identifies the organic substance as comprising a composition of a free ligand or a transition metal-substitutable metal-ligand complex, and a source of transition metal.

Claim 13 is an independent claim relating to a method of bleaching a substrate by applying a liquid bleaching composition that comprises an organic substance which forms a complex with the transition metal, the complex catalyzing bleaching by atmospheric oxygen without use of aldehydes, and a liquid carrier or solvent. The composition allows at least 50% of any bleaching of the substrate to be effected by oxygen sourced from the air and is substantially devoid of peroxygen bleach or a peroxy-based or -generating bleach system.

Claim 14 depends from method claim 13 and identifies the organic substance as comprising a pentadentate ligand of the general formula (B).

Claim 15 recites the method of claim 14 wherein the ligand is a specific material.

Claim 16 depends through the method claim 14 and specifies a pH range.

Claim 18 is an independent claim reciting a method of treating a textile with a liquid bleaching composition that comprises an organic substance which forms a complex with a transition metal, the complex catalyzing bleaching by atmospheric oxygen without use of aldehydes and a liquid carrier or solvent. Bleaching by the composition in a wash liquor is to at least 50% effected by oxygen sourced from the air and the composition is substantially devoid of peroxygen bleach or a peroxy-based or -generating bleach system. The complex catalyzes bleaching of the textiles by atmospheric oxygen after the textile has been removed from the wash liquor and dried.

Claim 19 depends from the composition of claim 1 specifying that the organic substance is a pentadentate ligand.

Claim 20 further specifies that the pentadendate ligand of the previous claim is in the form of an iron complex.

Claim 21 recites a composition according to claim 19 with a particular pH range and a specified ligand. The composition is substantially devoid of a transition metal sequestrant having a higher binding affinity for iron atoms than the aforementioned ligand.

Claim 22 relates to the composition of claim 1 wherein at least 90% of any bleaching of the substrate to be effected by oxygen is sourced from the air.

Claim 23 relates to the method of claim 13 wherein at least 90% of any bleaching of the substrate is to be effected by oxygen sourced from the air.

Claim 24 is a method relating to claim 18 wherein bleaching by the composition in the wash liquor is at least 90% effected by oxygen sourced from the air.

VI. ISSUES

Are claims 1, 2, 4-14, 16, 18-20 and 22-24 obvious under 35 U.S.C. § 103(a) over WO 97/38074, WO 95/34628 or WO 97/48787?

VII. GROUPING OF THE CLAIMS

All claims stand or fall together.

VIII. ARGUMENT

Are claims 1, 2, 4-14, 16, 18-20 and 22-24 obvious under 35 U.S.C. § 103(a) over WO 97/38074, WO 95/34628 or WO 97/48787?

Bleaching of textiles, such as laundry fabrics, has traditionally been accomplished by hypochlorite and peroxygen compounds. Hypochlorite often is much too aggressive. White garments usually are the only type that can be treated with hypochlorite. For this reason, peroxygen bleaching has gained prominence. A problem with this technology is that peroxygen compounds are relatively expensive. Catalysts such as organic bleach precursors and organometallic complexes have been used to accelerate peroxygen compound decomposition into bleaching actives.

Some have dreamed about snatching oxygen from the air to use in place of expensive peroxygen compounds. This was a search which few thought would be successful. The closest progress was embodied in two different approaches. One of these is exemplified in WO 97/38074. In the presence of specific types of aldehydes and preferably with a free radical initiator, oxygen sourced from the air when bubbled through an aqueous solution achieved a bleaching effect on stained fabric. Very low levels of bleaching were achieved, and none could be done without the aldehyde intermediate. Moreover, very significant concentrations of aldehyde were necessary for oxidation to occur.

A second successful approach was use of Methanol Oxidase (MOX) and ethanol into which oxygen gas was bubbled to generate hydrogen peroxide. In this peroxide generating system the MOX enzyme was believed to first convert ethanol via air to acetaldehyde. A main disadvantage of this system is the need for very large amounts of ethanol. Furthermore, the system provides relatively low conversion rates.

Other than the aldehyde mediated approach of WO '074 or MOX enzyme/ethanol approach, there was little hope for relatively efficient and direct air oxidation. The two prior prototypes were not efficient and consumed aldehydes/ethanol on almost a molar basis. Even with these modest successes, those working in this art had little hope of any purely atmospheric oxygen bleaching of textiles. Yet this is what appellant has accomplished through the present invention.

WO '787 employs bleach catalysts having poly-dentate ligands containing at least 6 heteroatoms. In the Examples, these complexes are combined with hydrogen peroxide to produce bleaching on test cloths. The disclosure describes at length peroxy compounds needed in combination with the iron catalysts. See page 8 (line 14) bridging to page 11 (line 34).

Atmospheric oxygen bleaching is not inherent in this disclosure. An overkill amount of peroxide is used in all the Examples. Atmospheric oxygen is very much more stable than the peroxides and would not compete successfully with the latter.

The reference does mention "molecular oxygen" at page 11 (line 33) and in the Abstract. Those skilled in the art understand the term "molecular oxygen" as not being air that can directly combine with the iron catalysts. Those skilled in the art had exceedingly few templates that would demonstrate bleaching through air. The "molecular oxygen" to those skilled in the art

could only be such systems as reported in WO '074. A major limitation of those systems is the requirement for an aldehyde and a free radical initiator. Without the aldehyde/initiator, there is no fixation of oxygen. Further, the system provides very poor performance. Appellant's independent claim specifies that the atmospheric oxygen bleaching occurs without use of aldehydes. "Molecular oxygen" is simply not identical to bleaching directly with air and a transition metal catalyst. Again, it is noted that the present claims explicitly exclude use of aldehydes as bleaching intermediate vehicles.

Anyone skilled in the art considering this reference as a basis for the present invention would have several serious questions. A first question is why the reference uses the phrase "molecular oxygen" instead of the much more common "oxygen", "air" or "atmospheric oxygen". Why does "molecular" adjective "oxygen"? Thus, it is appellant's position that for the present invention, the reference phrase of "molecular oxygen" is non-enabling.

A further reason exists for not equating "molecular oxygen" with "atmospheric oxygen". Were the reference to have meant atmospheric oxygen it would simply have stated that the catalyst would need no peroxide generating system at all. Oxygen or air would always be present in the environment of laundry, dishwashing or hard surface cleaning. Positive recitation of "molecular oxygen" would have to mean something other than atmospheric oxygen or air.

Still there is a further consideration. The reference states that molecular oxygen may be used as the oxidant "as an alternative to the above described peroxide generating systems". This means that the "molecular oxygen" species must be something which is peroxide generating, *and the resulting generated peroxide is the species which the iron complex activates.* Simple atmospheric oxygen is not a peroxide generating system.

Indeed if WO '787 had contemplated that mere atmospheric oxygen would be enough as a co-reactive with the iron complexes, the inventors of that invention would not have relied so heavily upon the complicated peroxy compounds as co-actives. In fact, the inventors in WO '787 would have demonstrated their iron complex (even in a hypothetical example) utilizing air alone. Yet this is not what is found in that reference. WO '787 did not recognize atmospheric oxygen as a co-reactive and any mention of "molecular oxygen" no doubt to the appellant and anyone skilled in the art must have meant much more than merely air.

Another aspect of the claims is that at least 50% of bleaching must be effected by oxygen sourced from the air. Even if the reference phrase "molecular oxygen" were assumed merely to be atmospheric oxygen, there is no suggestion that it would be sufficiently effective to allow as much as at least 50% of any bleaching of the substrate.

According to the Examiner, "oxygen is oxygen and would perform the same function regardless of where it is sourced."

Appellant considers the term "molecular oxygen" to be indefinite with respect to rendering the instant claims obvious. Even if "molecular oxygen" is to be given the Examiner's meaning of ground state (triplet) oxygen, there still would remain the issue of how much oxygen is needed to accomplish the oxidant function. Does WO '787 mean 100% gaseous oxygen? Is 50% gaseous oxygen sufficient as an oxidant? Or is 21% oxygen as sourced from the air sufficiently effective? Even if a skilled chemist were to select the most unlikely and most unreactive oxidant, i.e. molecular oxygen, it would still not be obvious that bleaching could be achieved in the diluted medium of air. At the very least the skilled chemist would operate in pure or at least very highly enriched gaseous oxygen environment to achieve bleaching by the catalyst. In short, the reference is non-enabling with respect to the term "molecular oxygen".

Appellant draws attention to the Examples in WO '787 demonstrating the bleaching process. See Examples 3-4. These examples utilize hydrogen peroxide as the oxidant. If "molecular oxygen" were effective why would the patentee employ hydrogen peroxide, a much more expensive material than air? Those skilled in the art could only assume that air was non-operative. The further assumption by those skilled in the art considering this reference would be that an oxidant with greater oxidative power than merely gaseous oxygen would be necessary to achieve bleaching. Even with the terminology of "molecular oxygen" found in this reference, the skilled chemist would not likely look toward air as an effective source to achieve bleaching with the reported catalysts.

WO '628 under the header "The peroxy bleaching compound" employs 3.5 pages of text to describe all possible variants of such peroxy bleaching compounds. Held to the very end is "As an alternative to the above described peroxide generating systems, molecular oxygen may be used as the oxidant." See page 10 (line 36) bridging to page 11 (line 1).

Those skilled in laundry bleaching art would not interpret "molecular oxygen" as atmospheric oxygen or even air (i.e. 21% oxygen). Here is the logic that any skilled chemist would apply to this situation. WO '628 clearly requires a peroxy compound in conjunction with an oxidation catalyst. These compounds are quite active materials. They include hydrogen peroxide itself, inorganic and organic peroxides and peroxy acids. After a litany of all these relatively expensive reactive peroxides bridging pages 7-10, a caboose refers to "molecular oxygen". Were the latter to simply be interpreted as air, why would the reference deem it even necessary to mention relatively expensive, active peroxides? Indeed, this reference should simply have said an oxidation catalyst is sufficient (with air normally being present in a laundry

process). The inevitable answer must be that WO '628 in no way was advocating air as a suitable alternative to peroxy compounds.

So what was meant by "molecular oxygen"? Possibly the answer is found in Example 3. Therein is reported an oxygen saturated phosphate buffer solution containing Methanol Oxidase (MOX) and ethanol for generating hydrogen peroxide. In this peroxide generating system the MOX enzyme is believed to first convert ethanol via air to acetaldehyde. "Molecular oxygen" is the oxygen source but there is requirement that this must include an enzyme converted aldehyde.

In his Office Action response, the Examiner stated that he "still sees no distinction between the molecular oxygen and atmospheric oxygen as recited by the instant claims. The oxygen in the air is the same as molecular oxygen."

Besides the rationale already provided above, the Board may consider the following. The term "molecular oxygen" is a phrase of unusual construction. More likely than not, the phrase was coined not to include air per se. Atmospheric oxygen would tend to be excluded. Systems are the key to understanding the phrase. The cited art in discussing "molecular oxygen" actually means "molecular oxygen systems" which generate peroxides.

Another objection of the Examiner was stated as: "The fact that the catalyst bleaches when exposed to air is a property which is inherent to the particular type of catalyst chosen. Regardless of whether oxygen is from the air or called molecular oxygen which may be sourced from the air or another source, the oxygen is the same."

Appellant's independent claims recite a "complex catalysing bleaching of a substrate by atmospheric oxygen". This phrase includes only those catalysts which actually do achieve bleaching simply through atmospheric oxygen. Yet the inherent potential activity of the complex was not previously known and not previously inherently practiced. While some complexes of the present invention may have been described in the literature, they either were not placed in a substrate bleaching situation or when in such situation were in contact with more energetic peroxides than atmospheric oxygen. Those synthetic peroxides would swamp any bleaching from atmospheric oxygen. Thus, any inherent action by atmospheric oxygen was neither appreciated nor inherent in the art.

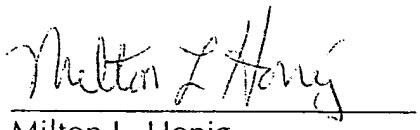
Further, the Examiner had stated: "Additionally, even though '074 teaches the use of aldehydes, the instant claims do **not exclude** the use of aldehydes but only state that the complex catalyzes the bleaching of a substrate by atmospheric oxygen without the use of aldehydes. Thus, since '074 teaches the same bleach catalysts as recited by the instant claims, the Examiner asserts that these catalysts would have the same bleaching properties without the use of aldehydes as recited by the instant claims, even though '074 may recognize the fact that aldehydes enhance such a bleaching effect."

Appellant's claims do not exclude the presence of small amounts of aldehydes. These small amounts are ubiquitously found in perfumes and some preservatives. Yet amounts of these types of aldehydes are insignificant for bleach promoting purposes. Appellant's claims **do exclude** those aldehydes in type and amount that would catalyze atmospheric oxygen to bleach the substrate. If any reactive aldehydes were present, their lower activation energy would cause their combination with the oxygen to result in bleach catalysis. Non-aldehyde reactive oxygen could not successfully compete. The present claims literally do exclude reactive aldehydes at levels that would compete with simple atmospheric oxygen bleaching.

Claims 3, 15 and 21 were objected to as being dependent upon a rejected base claim, but otherwise allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Appellant has demurred from this partial allowance.

In view of the foregoing remarks, the Board of Appeals and Interferences is requested to reverse the Examiner's rejection and provide a Decision favorable to Appellant.

Respectfully submitted,



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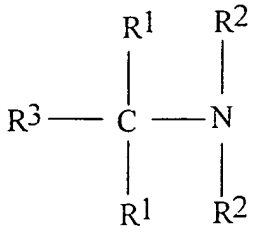
IX. APPENDIX

Claims on Appeal

1. A liquid bleaching composition comprising an organic substance which forms a complex with a transition metal, the complex catalysing bleaching of a substrate by atmospheric oxygen without use of aldehydes, and a liquid carrier or solvent, wherein the composition allows at least 50% of any bleaching of the substrate to be effected by oxygen sourced from the air and is substantially devoid of peroxygen bleach or a peroxy-based or -generating bleach system.

2. A liquid bleaching composition according to claim 1, wherein the organic substance comprises a pentadentate ligand of the general formula (B):



(B)

wherein

each R^1, R^2 independently represents $-R^4-R^5$, R^3 represents hydrogen, optionally substituted alkyl, aryl or arylalkyl, or $-R^4-R^5$,

each R^4 independently represents a single bond or optionally substituted alkylene, alkenylene, oxyalkylene, aminoalkylene, alkylene ether, carboxylic ester or carboxylic amide, and

each R^5 independently represents an optionally N-substituted aminoalkyl group or an optionally substituted heteroaryl group selected from pyridinyl, pyrazinyl, pyrazolyl, pyrrolyl, imadazolyl, benzimidazolyl, pyrididinyl, triazolyl and thiazolyl.

3. A liquid bleaching composition according to claim 2, wherein the ligand is N,N-bis(pyridin-2-yl-methyl)-1-,1-bis(pyridin-2-yl)-1-aminoethane.

4. A liquid bleaching composition according to claim 1, wherein the medium has a pH value in the range from pH 6 to 11.

5. A liquid bleaching composition according to claim 4, wherein the medium has a pH value in the range from pH 7 to 10.

6. A liquid bleaching composition according to claim 4, wherein the medium is substantially devoid of a transition metal sequestrant.

7. A liquid bleaching composition according to claim 6, wherein the medium further comprises a surfactant.

8. A liquid bleaching composition according to claim 4, wherein the medium further comprises a builder.

9. A liquid bleaching composition according to claim 1, wherein the organic substance comprises a preformed complex of a ligand and a transition metal.

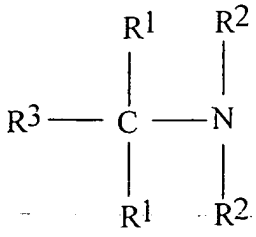
10. A liquid bleaching composition according to claim 1, wherein the organic substance comprises a free ligand that complexes with a transition metal present in the water.

11. A liquid bleaching composition according to claim 1, wherein the organic substance comprises a free ligand that complexes with a transition metal present in the substrate.

12. A liquid bleaching composition according to claim 1, wherein the organic substance comprises a composition of a free ligand or a transition metal-substitutable metal-ligand complex, and a source of transition metal.

13. A method of bleaching a substrate comprising applying to the substrate a liquid bleaching composition that comprises an organic substance which forms a complex with a transition metal, the complex catalysing bleaching of the substrate by atmospheric oxygen without use of aldehydes, and a liquid carrier or solvent, wherein the composition allows at least 50% of any bleaching of the substrate to be effected by oxygen sourced from the air and is substantially devoid of peroxygen bleach or a peroxy-based or -generating bleach system.

14. A method to claim 13, wherein the organic substance comprises a pentandentate ligand of the general formula (B):



(B)

wherein

each R^1, R^2 independently represents $-R^4-R^5$, R^3 represents hydrogen, optionally substituted alkyl, aryl or arylalkyl, or $-R^4-R^5$,

each R^4 independently represents a single bond or optionally substituted alkylene, alkenylene, oxyalkylene, aminoalkylene, alkylene ether, carboxylic ester or carboxylic amide, and

each R^5 independently represents an optionally N-substituted aminoalkyl group or an optionally substituted heteroaryl group selected from pyridinyl, pyrazinyl, pyrazolyl, pyrrolyl, imidazolyl, benzimidazolyl, pyrimidinyl, triazolyl and thiazolyl.

15. A method according to claim 14, wherein the ligand is N,N-bis(pyridin-2-yl-methyl)-1,1-bis(pyridin-2-yl)-1-aminoethane.

16. A method according to claim 14, wherein the method is conducted in a medium having a pH value in the range from pH 6 to 11.

18. A method of treating a textile by contacting the textile with a liquid bleaching composition that comprises an organic substance which forms a complex with a transition metal, the complex catalysing bleaching by atmospheric oxygen without use of aldehydes, and a liquid carrier or solvent, wherein bleaching by the composition in a wash liquor is to at least 50% effected by oxygen sourced from the air and the composition is substantially devoid of peroxygen bleach or a peroxy-based or -generating bleach system, whereby the complex catalyses bleaching of the textile by atmospheric oxygen after the textile has been removed from the wash liquor and dried.

19. A liquid bleaching composition according to claim 1, wherein the organic substance comprises a pentadentate ligand.

20. A liquid bleaching composition according to claim 19, wherein the pentadentate ligand is in the form of an iron complex.

21. A liquid bleaching composition according to claim 19 having a pH value in the range from pH 7 to 10 comprising N,N-bis(pyridin-2-yl-methyl)-1,1-bis(pyridin-2-yl)-1-aminoethane, the composition substantially devoid of a transition metal sequestrant having a higher binding affinity for iron ions than N,N-bis(pyridin-2-yl-methyl)-1,1-bis(pyridin-2-yl)-1-aminoethane.

22. A liquid composition according to claim 1 wherein the composition allows at least 90% of any bleaching of the substrate to be effected by oxygen sourced from the air.

23. A method according to claim 13 wherein the composition allows at least 90% of any bleaching of the substrate to be effected by oxygen sourced from the air.

24. A method according to claim 18 wherein bleaching by the composition in the wash liquor is to at least 90% effected by oxygen sourced from the air.